Linux System Usage
(System Monitoring)

Problem 1 : Monitoring Linux Server

Task 1: Finding Hardware & OS Info

Use the `uname` command to determine the following.

   a. Which version of Linux kernel are you using? (`uname -sr`) What does `-s` and `-r` stand for?
   b. What is the hardware type of your machine (32bit or 64bit)? (`uname -m`)

Task 2: Finding Processor Info

Use the `cat` command to view the contents of `/proc/cpuinfo`.

   c. What's the family and model of the processor?
   d. How many cores does the processor have?
   e. What's the speed and cache size of the processor

Task 3: Finding Process Info

Use the `ps` command to determine the following information. (Try `ps` and `ps -efl` or possibly `ps aux`).

   f. Consult the manpage for `ps` to determine what the process state abbreviations S, R and Z mean? (`man ps`)
   g. How many users have processes running on the machine?
   h. Which process has the smallest process id?
   i. Do you recognize all these processes? Fine two you recognized and say their purpose. Find two you don't recognize and google to see if you can explain their purpose.
   j. Can you find any children of some process? List some of them and their process ids. (`ps -efl` will show process id, PID, as well as parent process id, PPID. The command `pstree` will also help you with this.)

Task 4: Monitoring CPU Performance

Bring up another command window. In the first, run the command `top`. (Note: Ctrl-C or q will exit top.)

   k. What percentage of time is the CPU spending in user mode, in system mode?

l. Name the top five processes which consume the most cpu cycles. Could you explain what applications those processes correspond to?

Task 5: Monitoring Memory Usage

Use the `vmstat` command to determine the following.

m. How much virtual memory is currently in use? (*swpd*)
n. Use `vmstat 5 5` to report statistics 5 times in a row with a 5 second delay. Which, if any, of the statistics reported change during the time when you start a firefox browser and then close it?
o. Go back to the command `top` and find which process uses the most memory.

Task 6: Monitoring Network

Use the `ifconfig` command. `ifconfig` displays information on the network devices on the computer.

p. What network interfaces are available? (ethx, lo, etc.)
q. What MAC and IP address do those network interfaces have?
r. How many packets have been sent and received by each?
s. Why do you think `lo` doesn't have a HWaddr entry?

Use the `netstat` command.

t. Use `netstat` alone to list the open connections. If you are logged in remotely, find the connections to the machine you are connecting from.
u. Use `netstat -rn` to display the routing table. What is the default gateway for this machine?

Task 7: Monitoring Disk Storage

Use the `mount` and the `df` commands (`df -h` is especially nice if it works) to determine the following:

v. How much total space is reserved for the root filesystem (`/`)? How much of that space is free?
w. What type of filesystem is the root file system? (`mount`)
x. How many partitions does the harddisk have?(`/dev/sda*` or `/dev/hda*`)

y. How many different file system types have you found in your system? Try to explain some of them: what are they used for?

Task 8: Monitoring IO devices
Use the command `lspci` to determine the following:

z. Does the machine have any Ethernet cards? What brand and model are they?
aa. What video card does the machine have?
bb. (Optional) What video driver does the machine use? (Hint: google)

Problem 2 : Monitoring Windows Server

Task 1: Finding Hardware & OS Info
Use the mouse to right click on the icon `My computer` and choose `properties`

a. What is the type and speed of the CPU in your machine?
b. What is the windows edition?
c. What's the windows system type?(32bit or 64bit)
d. How much physical memory does the system have?

Task 2: Monitoring CPU, Memory, and Processes
Run `taskmgr` from the command prompt (You can also start the task manager by typing `Ctrl-Alt-Delete`).

e. What is the process id of the system idle process?(If you cannot see the process id, choose from the menu "View->Select Columns...")
f. Does the task manager itself appear in the list of processes?
g. What application consumes the most memory?
h. What application consumes the most CPU cycles?

Task 3: Monitoring Network
Run `ipconfig` at the command prompt. If you cannot find the command console, type the command `cmd` on the search bar.

    i.   How many network interfaces does the machine have? What are they? Are they the same as what are on the Linux machine?

    j.   What MAC and IP address does each network interface have? Are they the same as what are on the Linux machine?

Run `netstat` at the command prompt.

    k.   `netstat` is used to list the open connections. First, use the ssh tool "putty" or "Secure Shell Client" (ssh) to log on linux server on your VM. Then, record the information of this ssh connection that `netstate` provides.

    l.   Use `netstat -rn` to display the routing table. What is the default gateway for this machine?

    m.   Did you notice any differences in the output of netstat on Windows versus the Linux version?

Task 4: Monitoring Storage and IO devices

Go to `My Computer` and open the `My Computer` Window. Use the mouse to right click on the icon `each driver (Like C:)` and choose `properties`, answer the following questions:

    n.   How many hard disks does the machine have?

    o.   How many partitions does each disk have? What is the size of each partition? And how much free space does each partition have?

    p.   What are the file system types on those partitions?

Click the menu `System Properties` and Click `Device Manager` on the Left column of the window, and answer the following questions

    q.   Can you find the network device? What are the network device's brand and model?

    r.   What's the video card?